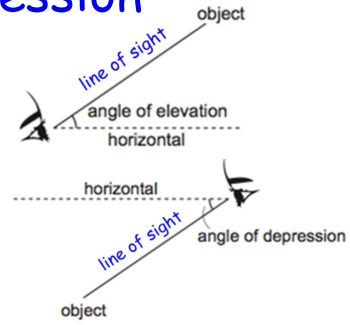


Angle of Elevation & Depression

Angle of Elevation = the angle between the horizontal sight line and a person's line of sight to an object above.

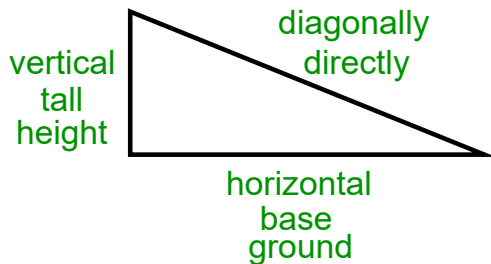
- also called angle of inclination

Angle of Depression = the angle between the horizontal sight line and a person's line of sight to an object below.



angle of elevation = angle of depression

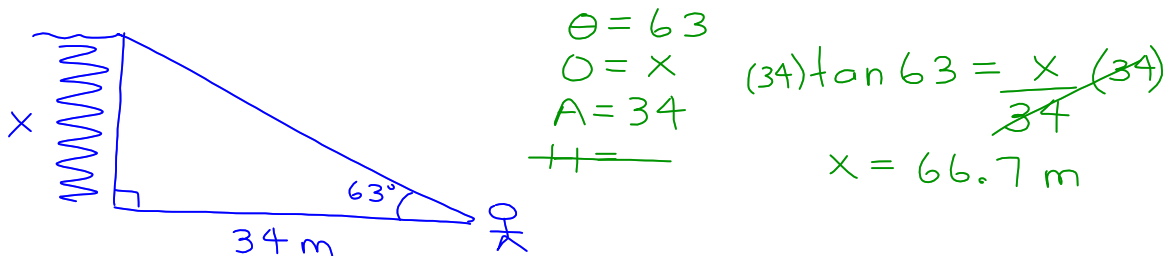
Key words matched to the sides of a triangle:



Necessary parts of your answer:

- labeled diagram
- formula
- sentence answer

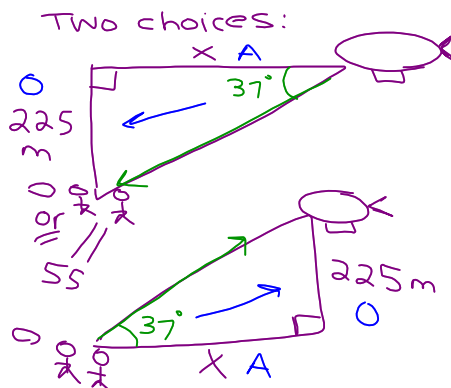
1. An observer is positioned 34 m from the base of a cliff. If the angle of elevation from the observer to the cliff is 63° , how tall is the cliff?



$$\begin{aligned} \theta &= 63 \\ O &= x \\ A &= 34 \\ \hline (34) \tan 63 &= \frac{x}{34} \quad (34) \\ x &= 66.7 \text{ m} \end{aligned}$$

The cliff is 66.7 metres tall.

2. From a good year blimp 225 metres high, the angle of depression to the ~~55 yd~~ ^{distractor} line of a football game is 37° . How far away, horizontally is the game?

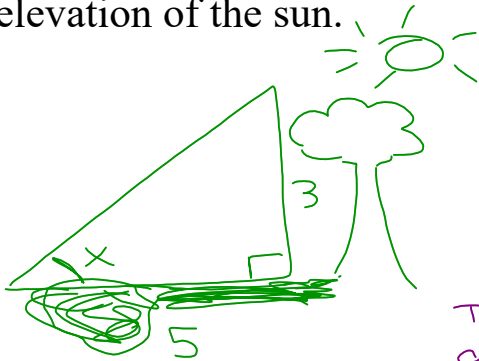


Two choices:

$$\begin{aligned} \theta &= 37 \\ O &= 225 \\ A &= x \\ \hline \tan 37 &= \frac{225}{x} \\ x &= \frac{225}{(\tan 37)} \end{aligned}$$

The game is $x = 298.5 \text{ m}$
298.5 m away horizontally.

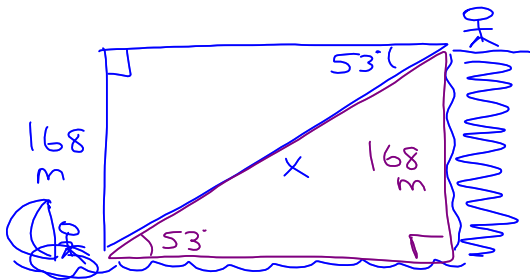
3. A tree, 3 m tall, casts a shadow 5 m long. Calculate the angle of elevation of the sun.



$$\begin{aligned} \theta &= x \\ O &= 3 \\ A &= 5 \\ H &= \end{aligned} \quad \begin{aligned} \tan x &= \frac{3}{5} \\ x &= \tan^{-1}\left(\frac{3}{5}\right) \\ x &= 31^\circ \end{aligned}$$

The sun is at an angle of 31° .

4. An observer on a cliff spots a windsurfer on water below. If the angle of depression from observer to surfer is 53° on a cliff 168 m above sea level, how far is the observer from the surfer directly?

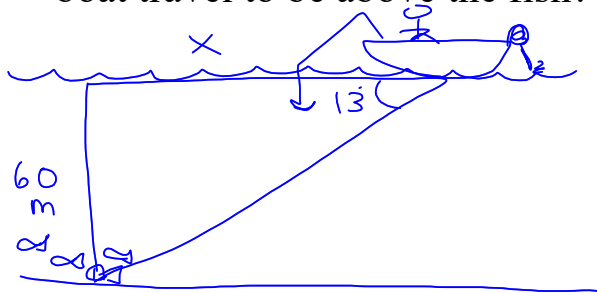


$$\begin{aligned} \theta &= 53 \\ O &= 168 \\ A &= \\ H &= x \end{aligned} \quad \begin{aligned} \sin 53 &= \frac{168}{x} \\ x &= \frac{168}{\sin 53} \\ x &= 210.3 \text{ m} \end{aligned}$$

The observer is 210.3 m directly from the wind surfer.

Either triangle is okay. (pick 1)

5. A fishing boat fishes in water which happens to be 60 metres deep and detects a school of fish using sonar. If the angle of depression of the equipment is 13° how far horizontally must the boat travel to be above the fish?



$$\begin{aligned} \theta &= 13 \\ O &= 60 \\ A &= x \\ H &= \end{aligned} \quad \begin{aligned} \tan 13 &= \frac{60}{x} \\ x &= \frac{60}{\tan 13} \\ x &= 259.8 \text{ m} \end{aligned}$$

The boat must travel 259.8 m to reach the fish.

Practice
WS
1-6
not hand-in
(check answers on key)